HOW DO FIRMS FORM THEIR EXPECTATIONS?

NEW SURVEY EVIDENCE

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How do agents form their expectations?

- One of the most fundamental questions in macroeconomics, finance, and other fields in economics.
How do agents form their expectations?

- One of the most fundamental questions in macroeconomics, finance, and other fields in economics.

- Inflation expectations play a central role in almost all key economic decisions

  - Prices and wages (Phillips curve): \( \pi_t = E_t \pi_{t+1} + \gamma \ast gap_t \)
  
  - Consumption decisions (Euler eqtn): \( c_t = E_t c_{t+1} - \sigma [i_t - E_t \pi_{t+1}] \)
  
  - Investment decisions (Tobin’s \( Q \)): \( Q_t = MPK/[i_t - E_t \pi_{t+1} + \delta] \)
  
  - Asset prices: \( p^{'stock}_t = E_t D_{t+1}/(i_t - E_t \pi_{t+1}) + E_t P^{'stock}_{t+1} \)
  
  - Central bank decisions (Taylor rule): \( i_t = \varphi_\pi E_t \pi_{t+h} + \varphi_x E_t x_{t+h} \)
EXPECTATIONS AND THE CENTRAL BANK

Inflation expectations play a particularly important role for central banks:

- Anchoring of inflation expectations

  Ben Bernanke (2007): “… The extent to which inflation expectations are anchored has first-order implications for the performance of inflation and of the economy more generally.”
EXPECTATIONS AND THE CENTRAL BANK

Inflation expectations play a particularly important role for central banks:

- Anchoring of inflation expectations
- Reducing uncertainty about monetary policy

Ben Bernanke (2010): “Improving the public's understanding of the central bank's policy strategy reduces economic and financial uncertainty and helps households and firms make more-informed decisions.”
EXPECTATIONS AND THE CENTRAL BANK

Inflation expectations play a particularly important role for central banks:

- Anchoring of inflation expectations
- Reducing uncertainty about monetary policy
- Forward-guidance

Ben Bernanke (2013): “Indeed, expectations matter so much that a central bank may be able to help make policy more effective by working to shape those expectations. … the effects of monetary policy on the economy today depend importantly not only on current policy actions, but also on the public's expectations of how policy will evolve”
EXPECTATIONS AND THE CENTRAL BANK

Inflation expectations play a particularly important role for central banks:

- Anchoring of inflation expectations
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- Forward-guidance

Challenges (Bernanke, 2007):

- How should the central bank best monitor the public's inflation expectations?
- How do changes in various measures of inflation expectations feed through to actual pricing behavior?
- What factors affect the level of inflation expectations and the degree to which they are anchored?
WHOSE EXPECTATIONS DO WE MEASURE?

- Professional forecasters
  - Survey of Professional Forecasters, Blue Chip Economic Indicators
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  - **No quantitative survey of firms’ expectations!**
WHAT WE’VE LEARNED ABOUT EXPECTATIONS

- **Similarities across agents**
  - There is widespread disagreement even among common groups of agents.
  - Agents’ beliefs respond only gradually to economic shocks.
  - Full-information rational expectations is generally a poor approximation to agents’ beliefs.
WHAT WE’VE LEARNED ABOUT EXPECTATIONS

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- **Differences across agents**
  - There is much more disagreement among consumers than among professionals.
  - Inflation expectations of households are much less “anchored” than those of professionals or financial market participants.
WHAT WE’VE LEARNED ABOUT EXPECTATIONS

[Graph showing time series data for Asset Prices, Michigan, and SPF (CPI) from 1980 to 2010.]

- Red dashed line: Asset Prices
- Blue line: Michigan
- Black line: SPF (CPI)
WHAT WE’VE LEARNED ABOUT EXPECTATIONS

WHAT DO FIRMS EXPECT?

- Asset Prices
- Michigan
- SPF (CPI)
OUR OBJECTIVE

- Quantitative survey of firms’ expectations
  - Are firms close to professional forecasters or households?
  - Disagreement

- Understand properties of expectations and forecast errors
  - Persistence of forecast errors
  - Degree of competition
  - Curvature of profit function

- Study a country with a long history of inflation targeting and, hence, presumably anchored inflation expectations
SURVEY

• Random sample (about 3,000 firms):
  o Broad sectoral coverage
  o Exclude very small firms (less than 6 employees)
SURVEY

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  - Send questionnaire in advance
  - Phone interview
  - Record interviews and get responses verified by another person
  - Response rate ≈ 30 percent
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- Questions about expectations, price setting, market structure
QUALITY OF THE SURVEY

Many entry checks, cross-checks, validations, follow-ups, etc.:

- Check responses using publicly available data (e.g. age of firms).
- Independent inquiries about prices (online, phone, email).
- Check consistency of responses in the main and follow-up surveys.
- Check whether planned price changes are close to actual price changes.
**FACT #1: MACROECONOMIC FORECASTS OF ECONOMIC AGENTS**

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- Huge disagreement across firms
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- Huge disagreement across firms
- High inflation expectations ⇒ Poor anchoring of inflation expectations
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- Huge disagreement across firms
- High inflation expectations ⇒ Poor anchoring of inflation expectations
- Much more akin to households’ expectations than those of professionals or central bankers.
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- Mean forecasts for other macro variables ARE similar across types of agents
- Large disagreement across firms
FACT #2: PERVERSIVE INATTENTION

_During the last 12 months_, by how much do you think prices changed overall in the economy?

_actual inflation 1.6%_
**FACT #3: LARGE SECTORAL VARIATION IN INATTENTION**

Share of “informed” firms by sector (errors about past inflation < 2%):

- Manufacturing: ~ 70%
- Retail trade: ~ 80%
- Wholesale trade: ~ 80%
- Finance and insurance: ~ 15%
- Accounting: ~ 10%
- Other professional services: ~ 10%
- Construction and transportation: ~ 20%
FACT #4: INATTENTION IS PERSISTENT

The speed of learning is similar to the speed in the U.S. (i.e. slow).
FACT #5: BELIEFS ABOUT THE PAST ARE CORRELATED WITH BELIEFS ABOUT THE FUTURE

$b = .6$

$se = (.03)$

$R^2 = .18$
FACT #6: LARGE REVISIONS OF FORECASTS/BACKCASTS

Consistent with weak anchoring of inflation expectations
FACT #7: INCENTIVES MATTER FOR QUALITY OF BELIEFS

Firms facing more competitors have better forecasts/backcasts.
**FACT #7: INCENTIVES MATTER FOR QUALITY OF BELIEFS**

Firms expecting to change prices sooner have better forecasts/backcasts.
**FACT #7: INCENTIVES MATTER FOR QUALITY OF BELIEFS**

Firms with steeper profit functions have better forecasts/backcasts.

![Graph showing the relationship between mean belief about past inflation and mean forecast of future inflation across different profit function categories.]

- **Flattest Profit Function (0%-33%)**
- **Medium (33%-67%)**
- **Steepest Profit Function (67%-100%)**
**FACT #7: INCENTIVES MATTER FOR QUALITY OF BELIEFS**

What matters less for quality of firms’ macroeconomic beliefs:

- **SIZE**: larger firms do not tend to have better beliefs (if anything, they’re systematically worse).

- **FIRMS’ PAST PRICE CHANGES**: firms who’ve recently raised their prices by more do not believe that inflation was higher, nor do they anticipate higher inflation in the future.

- **INDUSTRY PRICES**: firms in industries which have experienced higher recent inflation do not believe that overall inflation was higher, nor do they anticipate higher inflation in the future.
ANSWERING BERNANKE’S (2007) CHALLENGE

1. How should the central bank best monitor the public’s inflation expectations?

   - Firms’ expectations play a key role in macroeconomics. Their incentives to collect and process macroeconomic information differ from those of professionals and households. Tracking their expectations directly via surveys is an imperative.

   - Current state: “theory ahead of business cycle measurement”
ANSWERING BERNANKE’S (2007) CHALLENGE

1. How should the central bank best monitor the public’s inflation expectations?

2. How do changes in various measures of inflation expectations feed through to actual pricing behavior?

   - Firm-level data can show how channels of how inflation expectations feed into inflation

   - Predictability of firms’ subsequent price changes suggests that one might be able to better predict future inflation by surveying firms’ expectations of their own price changes.

   - Survey questions:
     - When do you expect this firm to next change its price of the main product and by how much?
     - If this firm was free to change its price right now or in three months, by how much would it change its price in either case?
PLANNED VS. ACTUAL PRICE CHANGES

Survey question: When do you expect this firm to next change its price of the main product and by how much?

Firms are very good at predicting the timing and size of their next price changes.
ANSWERING BERNANKE’S (2007) CHALLENGE

1. How should the central bank best monitor the public's inflation expectations?

2. How do changes in various measures of inflation expectations feed through to actual pricing behavior?

3. What factors affect the level of inflation expectations and the degree to which they are anchored?
   - Firm level surveys can shed new light on what determines (in)attention and anchoring of inflation expectations.
   - Incentives matter: in a low-inflation environment, firms may have little incentive to carefully monitor inflation patterns, so “anchoring” firms’ inflation expectations may be difficult to achieve.
   - Survey question:
     * If this firm was free to change its price right now or in three months, by how much do you think profits would change as a share of revenues?
ANSWERING BERNANKE’S (2007) CHALLENGE

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Need a U.S. survey of firms’ expectations to answer these challenges

- Direct measure of expectations of PRICE-SETTING agents
- Understand incentives of firms to collect/process information and set prices
- Invaluable feedback and leading inflation indicators for the Fed
- Identify margins/channels to anchor expectations
Carola Binder (2014) compiled additional survey evidence:

- March 2009: 45% of consumers knew that Ben Bernanke was Fed chair out of 4 options
  - Source: Pew Research Center for the People & the Press Political Knowledge Update Survey
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People/firms could be grossly unaware of what the CB wants to do